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ENVIRONMENTAL AIR ENFORCEMENT BRANCH & REMEDIATION
U.S. EPA, REGION 5

KPRG and Associates, Inc.

RECEIVED

August 31, 2005

SEP 07 2005

AIR ENFORCEMENT BRANCH
U.S.

VIA CERTIFIED U.S. MAIL

Ms. Elissa Hartfield
Department of Air Pollution Control
Northwest District Office
Ohio Environmental Protection Agency
347 North Dunbridge Road
Bowling Green, Ohio 43402-9398

Re: SK Hand Tool Corporation
135 Hickory Street
Defiance, Ohio 43512
Site ID No. 0320010139

KPRG Project No. 21404.5

Ms. Hartfield:

I am writing to follow up on my letter to you of June 29, 2005 regarding compliance with NESHPAP regulations applicable to the chrome plating operation at the facility.

By way of background, the facility began operating an electroplating line in 1974 which deposits a thin layer of chromium on hand tools to provide a bright finish and wear and tarnish resistance. The electroplating line has only one chrome tank subject to the regulation. This tank, containing a hexavalent chrome acid bath, is operated within the following process parameters:

Chrome plate thickness:	.0254-1.905	microns
Current density:	70-80	Amperes/ft ²
Plating time:	0.5-5	minutes
Chromic acid concentration	40	ounces/gallon
Sulfuric acid concentration	<0.2	ounces/gallon
Solution temperature:	110	degrees F

Based on these operating parameters and USEPA definitions, the SK electroplating operation falls under the category of "Decorative Chromium Electroplating" at a small area source.

As discussed in the June 29, 2005 letter, attached please find the Initial Notification Report included as Attachment A and the Notification of Compliance Status included as Attachment B. The facility will complete, on an annual basis, the Ongoing Compliance

Status Report. If warranted, based on the frequency of malfunctions and/or excess emissions, the report will be prepared on a semi-annual basis.

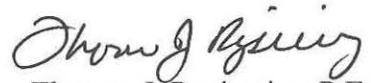
Available records document that the facility has been in compliance with NESHAP emission limits. Since before 1996, the operation has used a chemical fume suppressant/wetting agent for controlling emissions from the chromic acid bath. As a result, the operation is subject to a surface tension limit but is not required to do initial performance testing. The facility has consistently monitored the surface tension using a stalagmometer. Based on the NESHAP regulation, this results in an applicable surface tension limit of 45 dynes/cm. Review of available monthly records for the period of January, 2000 through July, 2005 indicates that all measurements were well below 45 dynes/cm with the exception of only one reading (May 8, 2000) which was at 51 dynes/cm. All other measurements were in the range of 20-34 dynes/cm. Copies of these records are included as Attachment C. Records prior to 2000 are no longer readily available, however, SK represents that the chrome plating line has been operated in essentially the same manner since prior to 1996. In addition, a copy of the manufacturer's specifications for the chemical fume suppressant/wetting agent currently in use at the facility (C.M.S. '96) is included in Attachment D.

The facility has also routinely inspected the chrome tank for its integrity, checked the process specific operating parameters, and monitored the surface tension in the chromic acid bath using a stalagmometer to assure its proper operation. The facility has developed a formal Operation & Maintenance (O&M) Plan that identifies the operational and maintenance activities performed to assure the proper operation of the process unit subject to this regulation. The O&M Plan also outlines procedures for identifying malfunctions and appropriate corrective actions to be implemented should a malfunction occur. A copy of this plan is kept at the facility. Recordkeeping required by the regulation is also being prepared.

Should you require any additional information or have any questions regarding this submittal, do not hesitate to contact us.

Respectfully submitted,

KPRG and Associates, Inc.



Thomas J. Rysiewicz, P.E.
Principal

TJR:lm
Attachments

cc: Mr. G. Czerniak/USEPA, Region V
Mr. L. O'Connell
Mr. D. Rieser

ATTACHMENT A

INITIAL NOTIFICATION REPORT

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title SK HAND TOOL CORPORATION
 Street Address 9500 W. 55th STREET
 City McCOOK State ILLINOIS Zip Code 60525
 Plant Name SK HAND TOOL CORPORATION
 Plant Phone Number 419-784-1122
 Plant Contact>Title JEFF BADEN/ENGINEERING SUPERVISOR
 Plant Address (if different than owner/operator's):
 Street Address 135 HICKORY STREET
 City DEFIANCE State OHIO Zip Code 43512

2. Complete this section for all affected tanks using a chromic acid bath. If only trivalent chromium baths are used at the facility, go to No. 3.

A. Complete the following table. If additional lines are needed, make copies of this page.

Tank ID #	Type of tank	Startup date ¹	Total installed rectifier capacity (amperes)	Description of parts plated	Applicable emission limit	Compliance date ²
1	CHROME TANK	1974	5,000	HAND TOOLS	*	1/25/96

¹New or reconstructed tanks with an initial startup date after 1/25/95 must submit a NOTIFICATION OF CONSTRUCTION/RECONSTRUCTION form and notify the Administrator of the date construction/reconstruction commenced and the actual startup date in accordance with 40 CFR 63.347(c)(2).

* APPLICABLE EMISSION RATE IS 45 DYNES/CM USING A STALAGMOMETER

INITIAL NOTIFICATION REPORT (continued)

?Compliance dates for existing tanks (i.e., tanks for which operation commenced on or before 12/16/93):

Hard chromium plating tanks	Y 1/25/97
Decorative chromium plating tanks	Y 1/25/96
Chromium anodizing tanks	Y 1/25/97

Compliance dates for new tanks (i.e., tanks for which construction or reconstruction commenced after 12/16/93): If

initial startup occurred between 12/16/93 and 1/25/95	Y 1/25/95
If initial startup occurred after 1/25/95	Y upon startup

EXAMPLE RESPONSE:

Tank ID #	Type of tank	Startup date	Total installed rectifier capacity (amperes)	Description of parts plated	Applicable emission limit	Compliance date
1	Chrome anodizing	1/1/85	5,000	Aircraft landing gear	45 dynes/cm or 0.01 mg/dscm	1/25/97
2	Hard chrome plating	1/1/85	10,000	pistons	0.015 mg/dscm	1/25/97
3	Hard chrome plating	1/1/95	12,000	pistons	0.015 mg/dscm	1/25/95
4	Hard chrome plating	3/1/95	12,000	pistons	0.015 mg/dscm	3/1/95

B. Check the box that applies.

- Tanks are located at a facility that is a major source.
- Tanks are located at a facility that is an area source.

NOTE: A major source is a facility that emits greater than 10 tons per year of any one hazardous air pollutant (HAP) or 25 tons per year of multiple HAPs. All other sources are area sources. The major/area source determination is based on all HAP emission points inside the facility fenceline, not just the chromium electroplating and anodizing tanks.

C. Complete the following if hard chromium electroplating tanks are operated. Check the box(es) that apply.

- The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
- The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
- Records show that the facility's previous 12-month cumulative current usage for the hard chromium electroplating tanks was less than 60 million amp-hr.

INITIAL NOTIFICATION REPORT (continued)

- The facility wishes to accept a Federally-enforceable limit of less than 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks.
3. Complete this section for all decorative chromium electroplating tanks using a trivalent chromium bath. If only chromic acid baths are used at the facility, go to No. 4.

A. Complete the following table. If additional lines are needed, make copies of this page.

Tank ID #	Startup date ¹	Description of parts plated	Compliance date ²

¹New or reconstructed tanks with an initial startup date after 1/25/95 must submit a NOTIFICATION OF CONSTRUCTION/RECONSTRUCTION form and notify the Administrator of the date construction/reconstruction commenced and the actual startup date in accordance with 40 CFR 63.347(c)(2).

²Compliance date for existing tanks (i.e., tanks for which operation commenced on or before 12/16/93) Y 1/25/96
Compliance dates for new tanks (i.e., tanks for which construction or reconstruction commenced after 12/16/93): If
initial startup occurred between 12/16/93 and 1/25/95 Y 1/25/95
If initial startup occurred after 1/25/95 Y upon startup

B. Provide a brief description of the trivalent chromium electroplating process used at your facility. Attach process flow diagrams for each plating line.

C. Check the box that applies.

- The trivalent process used at the facility incorporates a wetting agent.
 The trivalent process used at the facility does not incorporate a wetting agent.

INITIAL NOTIFICATION REPORT (continued)

D. List below (or attach a list of) the trivalent chromium bath components and clearly identify the wetting agent.

4. Print or type the name and title of the Responsible Official for the plant:

LEN O'CONNELL

VICE PRESIDENT - HUMAN RESOURCES AND MARKETING

(Name)

(Title)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, City, or County government; or
- A ranking military officer if the plant is located on a military base.

I Certify The Information Contained In This Report To Be Accurate And True To The Best Of My Knowledge.



(Signature of Responsible Official)

08/31/05

(Date)

ATTACHMENT B

NOTIFICATION OF COMPLIANCE STATUS

Applicable Rule: 40 CFR Part 63, Subpart N--National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title SK HAND TOOL CORPORATION
 Street Address 9500 W. 55th STREET
 City McCOOK State ILLINOIS Zip Code 60525
 Plant Name SK HAND TOOL CORPORATION
 Plant Phone Number 419-784-1122
 Plant Contact/Title JEFF BADEN/ENGINEERING SUPERVISOR
 Plant Address (if different than owner/operator's):
 Street Address 135 HICKORY STREET
 City DEFIANCE State OHIO Zip Code 43512

2. Complete the following table. If additional lines are needed, make copies of this page.

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control system ID #	Method to determine compliance ¹	Test method followed	Type and quantity of HAP emitted ²
1	Decorative chrome tank	45 dynes/cm	Fume suppressant	N/A	Surface tension	EPA Method 306B	Cr - 22 dynes/cm *
			Wetting agent		Measurement		

¹If a performance test was conducted, submit the test report containing the elements required by 40 CFR 63.344(a).

²If the compliance procedures of 40 CFR 63.344(e) are being followed, attach the calculations needed to support the emission limit expressed in mg/hr.

* 2005 average through July 6, 2005

EXAMPLE RESPONSE:

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control system ID #	Method to determine compliance ¹	Test method followed	Type and quantity of HAP emitted ²
1	Hard chrome plating	0.015 mg/dscm	Composite mesh-pad system	10	Performance test	EPA Method 306	Cr 0.009 mg/dscm
2	Chrome anodizing	45 dynes/cm	Wetting agent fume suppressant	N/A	Surface tension measurement	EPA Method 306B	Cr 40 dynes/cm
3	Decorative chrome plating	0.01 mg/dscm	Foam blanket	N/A	Performance test	EPA Method 306A	Cr 0.005 mg/dscm

NOTIFICATION OF COMPLIANCE STATUS (continued)

3. Complete the following table for each control technique used. If additional lines are needed, make copies of this page

Control system ID #	Tank ID #(s)	Range of site-specific operating parameter values ¹			
		Pressure drop	Velocity pressure	Surface tension	Foam blanket thickness
N/A	1	N/A	N/A	45 dynes/cm	N/A

¹If the applicable monitoring and reporting requirements to demonstrate continuous compliance differ from those in 40 CFR Part 63, subpart N, attach a description. Parameter value ranges are established through initial performance testing and are those that correspond to emissions at or below the level of the standard(s).

EXAMPLE RESPONSE:

Control system ID #	Tank ID #(s)	Range of site-specific operating parameter values ¹			
		Pressure drop	Velocity pressure	Surface tension	Foam blanket thickness
10	1	7 in. w.c. ± 1 in.	N/A	N/A	N/A
N/A	2	N/A	N/A	#45 dynes/cm	N/A
N/A	3	N/A	N/A	N/A	\$1 inch

4. Complete the following if hard chromium electroplating tanks are operated (check the box(es) that apply):

- The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
- The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
- Records show that the facility's previous annual actual rectifier capacity of the hard chromium electroplating tanks was less than 60 million amp-hr/yr. If so, submit the records that support this rectifier capacity for any 12-month period preceding the compliance date, or submit a description of how operations will change to meet this rectifier capacity limit. For new sources, the capacity can be that projected for the first 12-month period of tank operation.

NOTIFICATION OF COMPLIANCE STATUS (continued)

- The facility has accepted or will accept a Federally-enforceable limit of 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks.

5. Check one of the following boxes that describes the facility's compliance status:

- The facility is in compliance with the provisions of 40 CFR part 63, subpart N.
 The facility is not in compliance with the provisions of 40 CFR part 63, subpart N.

6. Print or type the name and title of the Responsible Official for the plant:

LEN O'CONNELL

VICE PRESIDENT - HUMAN RESOURCES AND MARKETING

(Name)

(Title)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, City, or County government; or
- A ranking military officer if the plant is located on a military base.

I Certify That An Operation And Maintenance Plan Has Been Completed And The Plan And Other Work Practice Standards Of 40 CFR 63.342(f) Are Being Followed.



08/31/05

(Signature of Responsible Official)

(Date)

I Certify That The Information Contained In This Report Is Accurate And True To The Best Of My Knowledge.



08/31/05

(Signature of Responsible Official)

(Date)

ATTACHMENT C

2005**CHROME**

	SG	OZ/GAL CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JANUARY	1					
	2					
	3					
	4	1.19852			26	22
	5	1.19852			24	20
	6	1.19852	38.15	0.18	212	26
	7	1.19852			26	22
	8					
	9					
	10	1.20499			26	22
	11	1.20499			26	22
	12	1.20499			26	22
	13	1.20499	39.36	0.18	219	27
	14	1.20499			27	22
	15					
	16					
	17	1.21412			25	21
	18	1.21412			25	21
	19	1.21412			26	21
	20	1.21412	41.14	0.18	229	26
	21	1.21412			26	21
	22					
	23					
	24	1.20958			26	21
	25	1.20958			27	22
	26					
	27	1.20958			26	21
	28	1.20958	40.25	0.16	252	26
	29	1.20958			25	21
	30					ERR
	31	1.21146			26	21
FEBURARY	1	1.21146	40.62	0.18	226	25
	2	1.21146			26	21
	3	1.21146			26	21
	4	1.21146			26	21
	5					
	6					
	7	1.21106			26	21
	8	1.21106			25	21
	9	1.21106	40.54	0.18	225	27
	10	1.21106			26	21
	11	1.21106			25	21
	12					
	13					
	14	1.20927			25	21
	15	1.20927			24	20
	16	1.20927	40.19	0.18	223	26

2005

CHROME

	SG	OZ/GAL CHROME	SO4	RATIO	SP READING	SURFACE TENSION
MARCH	17	1.20927			26	22
	18	1.20927			26	22
	19					
	20					
	21	1.20840			25	21
	22	1.20840			26	22
	23	1.20840	40.02	0.18	222	27
	24	1.20840			26	22
	25	1.20840			27	22
	26					
	27					
	28	1.20339				
	1	1.20339			27	22
	2	1.20339	38.09	0.18	212	27
	3	1.20339			26	22
	4	1.20339			27	22
	5					
	6					
	7	1.21208			27	22
	8	1.21208			27	22
	9	1.21208	40.74	0.18	226	27
	10	1.21208			26	21
	11					
	12					
	13					
	14	1.20942			27	22
	15	1.20942			27	22
	16	1.20942	40.22	0.18	223	27
	17	1.20942			27	22
	18	1.20942			26	21
	19					
	20					
	21	1.20633			27	22
	22	1.20633	39.62	0.18	220	27
	23	1.20633			27	22
	24	1.20633			27	22
	25					
	26					
	27					
	28	1.20902			27	22
	29	1.20902			27	22
	30	1.20902	40.14	0.17	236	27
	31	1.20902			27	22
	1	1.20902			27	22
	2					
	3					
	4	1.20768			26	22

2005**CHROME**

	SG	OZ/GAL CHROME	SO4	RATIO	SP READING	SURFACE TENSION
5	1.20768	39.88	0.18	222	26	22
6	1.20768				27	22
7	1.20768				27	22
8	1.20768				27	22
9						
10						
11	1.21646				28	23
12	1.21646	41.60	0.18	231	26	21
13	1.21646				27	22
14	1.21646				27	22
15	1.21646				27	22
16						
17						
18						
19						
20						
21						
22						
23						
24						
25	1.22392				27	22
26	1.22392				27	22
27	1.22392	43.13	0.18	240	28	23
28	1.22392				27	22
29	1.22392				27	22
30						
MAY	1					
	2	1.21488			28	23
	3	1.21488	41.29	0.18	229	27
	4	1.21488			27	22
	5	1.21488			27	22
	6	1.21488			27	22
	7					
	8					
	9	1.21442			28	23
	10	1.21442	41.20	0.16	258	27
	11	1.21442			27	22
	12	1.21442				
	13	1.21442			27	22
	14					
	15					
	16	1.22332			27	22
	17	1.22332			27	22
	18	1.22332	43.01	0.17	253	27
	19	1.22332			27	22
	20	1.22332			28	23
	21					

2005**CHROME**

	SG	OZ/GAL CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	22					
	23	1.22161			28	23
	24	1.22161			28	23
	25	1.22161	42.67	0.16	267	22
	26	1.22161			29	24
	27	1.22161			27	22
	28					
	29					
	30					
JUNE	31	1.21779			28	23
	1	1.21779	41.86	0.18	233	22
	2	1.21779			28	23
	3	1.21779			28	23
	4					
	5					
	6					
	7					
	8					
	9					
	10	1.21779			27	22
	11	1.21779			29	24
	12					
	13					
	14					
	15	1.22016	42.38	0.18	235	24
	16	1.22016			27	22
	17	1.22016			28	23
	18					
	19					
	20	1.20292			28	23
	21	1.20292			29	24
	22	1.20292	39.01	0.16	244	24
	23	1.20292			28	23
	24	1.20292			28	23
	25					
	26					
	27	1.21779			28	23
	28	1.21779	41.86	0.18	233	24
	29	1.21779			29	24
	30	1.21779			29	24
JULY	1	1.21779			28	23
	2					
	3					
	4					
	5	1.22277			28	23
	6	1.22277	42.90	0.18	238	23

JULY 2005 PLATING BATH TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
1	1.21779				28	23
2						
3						
4						
5	1.22277				28	23
6	1.22277	42.90	0.18	238	28	23
7	1.22277				27	22
8	1.22277				29	24
9						
10						
11	1.21310				29	24
12	1.21310	40.94	0.18	227	29	24
13	1.21310				29	24
14	1.21310				28	23
15	1.21310				29	24
16						
17						
18	1.22493				30	24
19	1.22493				29	24
20	1.22493				29	24
21	1.22493	43.33	0.18	241	30	24
22	1.22493				29	24
23						
24						
25	1.21121				30	25
26	1.21121				29	24
27	1.21121	40.57	0.16	254	30	25
28	1.21121				29	24
29	1.21121				28	23
30						
Avg	1.21775	41.94	0.18	240	29	24

AUG. 6, 2005 11:36AM 419 780 0412 1001

No. 2984

PLATING BATH 2004 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JANUARY	1					
	2					
	3					
	4					
	5	1.19631			24	20
	6	1.19631			24	20
	7	1.19631			24	20
	8	1.19631			25	21
	9	1.19631			24	20
	10	1.19631	37.72	0.18	210	
	11					
	12	1.20069			26	22
	13	1.20069			25	21
	14	1.20069			24	20
	15	1.20069			25	21
	16	1.20069			24	20
	17	1.20069	38.58	0.20	193	22
	18					
	19					
	20	1.19273			26	22
	21	1.19273			25	21
	22	1.19273			25	21
	23	1.19273			25	21
	24	1.19273	37.00	0.20	185	20
	25					
	26	1.20840			26	22
	27	1.20840			25	21
	28	1.20840			25	21
	29	1.20840			26	22
	30	1.20840			25	21
	31		40.02	0.20	200	
FEBURARY	1					
	2	1.20902			26	22
	3	1.20902			25	21
	4	1.20902			25	21
	5	1.20902			25	21
	6	1.20902			25	21
	7		40.14	0.20	201	
	8					
	9	1.20054			25	21
	10	1.20054			25	21
	11	1.20054			25	21
	12	1.20054			25	21
	13	1.20054			26	22
	14		38.55	0.22	175	
	15					

PLATING BATH 2004 TESTS

CHROME

		SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
MARCH	16	1.22201				25	20
	17	1.22201				26	21
	18	1.22201				26	21
	19	1.22201				25	20
	20	1.22201				26	21
	21		42.75	0.20	214		
	22						
	23	1.22201				26	21
	24	1.22201				26	21
	25	1.22201				26	21
	26	1.22201				26	21
	27	1.22201				26	21
	28						
	1	1.22171				26	21
	2	1.22171				27	22
	3	1.22171				26	21
	4	1.22171				26	21
	5	1.22171				27	22
	6	1.22171	42.69	0.28	152		
	7						
	8	1.20988				26	21
	9	1.20988				26	21
	10	1.20988				26	21
	11	1.20988				26	21
	12	1.20988				26	21
	13	1.20988	40.31	0.19	212		
	14						
	15	1.21575				26	21
	16	1.21575				26	21
	17	1.21575				26	21
	18	1.21575				26	21
	19	1.21575				26	21
	20	1.21575	41.46	0.20	207		
	21						
	22	1.20220				26	22
	23	1.20220				25	21
	24	1.20220				26	22
	25	1.20220				26	22
	26	1.20220				25	21
	27	1.20220	38.87	0.18	216	26	22
	28						
	29	1.20587				25	21
	30	1.20587				26	22
	31	1.20587				26	22
	1	1.20587				26	22
	2	1.20587				26	22
APRIL							

PLATING BATH 2004 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	3	1.20587	39.53	0.16	247	
	4					
	5	1.21121			25	21
	6	1.21121			25	21
	7	1.21121			25	21
	8	1.21121			26	21
	9		40.57	0.26	156	
	10					
	11					
	12	1.21310			26	21
	13	1.21310			26	21
	14	1.21310			25	21
	15	1.21310	40.94	0.17	241	26
	16	1.21310			27	22
	17					
	18					
	19	1.20499			26	22
	20	1.20499			25	21
	21	1.20499			25	21
	22	1.20499	39.36	0.14	281	26
	23	1.20499			25	21
	24					
	25					
	26	1.20499			25	21
	27	1.20499			26	22
	28					
	29					
	30					
MAY	1					
	2					
	3	1.19924			27	23
	4	1.19924			26	22
	5	1.19924			25	21
	6	1.19924			27	23
	7	1.19924			26	22
	8	1.19924	38.30	0.14	274	
	9					
	10	1.20345			26	22
	11	1.20345			26	22
	12	1.20345			26	22
	13	1.20345			25	21
	14	1.20345			26	22
	15	1.20345	39.10	0.14	279	
	16					
	17	1.20132			26	22
	18	1.20132			26	22

PLATING BATH 2004 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JUNE	19	1.20132	38.70	0.18	215	26 22
	20	1.20132				26 22
	21	1.20132				27 22
	22					
	23					
	24	1.20840				25 21
	25	1.20840				26 22
	26	1.20840				26 22
	27	1.20840	40.02	0.16	250	27 22
	28	1.20840				
	29					
	30					
	31					
	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
	15	1.18945				26 22
	16	1.18945				26 22
	17	1.18945				26 22
	18	1.18945				26 22
	19	1.18945	36.34	0.16	227	26 22
	20					
	21	1.21060				26 21
	22	1.21060				25 21
	23	1.21060				26 21
	24	1.21060	40.45	0.16	253	25 21
	25	1.21060				26 21
	26					
	27					
	28	1.19144				26 22
	29	1.19144				26 22
	30	1.19144				25 21
	1	1.19144	36.74	0.18	204	26 22
	2	1.19144				26 22
	3					
JULY						

PLATING BATH 2004 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	4					
	5					
	6	1.20132			27	22
	7	1.20132			26	22
	8	1.20132	38.70	0.18	215	28
	9	1.20132			26	22
	10					
	11					
	12	1.20429			27	22
	13	1.20429			27	22
	14	1.20429	39.24	0.18	218	27
	15	1.20429			27	22
	16	1.20429			26	22
	17					
	18					
	19	1.20309			28	23
	20	1.20309			26	22
	21	1.20309			27	22
	22	1.20309	39.04	0.18	217	27
	23	1.20309			27	22
	24					
	25					
	26	1.20840			27	22
	27	1.20840			27	22
	28	1.20840			27	22
	29	1.20840	40.02	0.20	200	28
	30	1.20840			29	24
	31					
AUGUST	1					
	2	1.19909			27	23
	3	1.19909			27	23
	4	1.19909			27	23
	5	1.19909	38.27	0.18	213	26
	6	1.19909			26	22
	7					
	8					
	9	1.21075			27	22
	10	1.21075			25	21
	11	1.21075			26	21
	12	1.21075	40.48	0.18	225	27
	13	1.21075			27	22
	14					
	15					
	16	1.21371			26	21
	17	1.21371			26	21
	18	1.21371	41.06	0.18	228	26

PLATING BATH 2004 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
SEPTEMBER	19	1.21371			26	21
	20	1.21371			26	21
	21					
	22					
	23	1.21213			26	21
	24	1.21213			26	21
	25	1.21213			26	21
	26	1.21213	40.74	0.20	204	21
	27	1.21213			25	21
	28					
	29					
	30	1.20973			25	21
	31	1.20973			25	21
	1	1.20973			25	21
	2	1.20973			25	21
	3	1.20973	40.28	0.20	201	22
	4					
	5					
	6					
	7	1.20886			25	21
	8	1.20886			26	22
	9	1.20886	40.11	0.20	201	22
	10	1.20886			25	21
	11					
	12					
	13	1.20825			25	21
	14	1.20825			25	21
	15	1.20825			25	21
	16	1.20825	39.99	0.20	200	22
	17	1.20825			25	21
	18					
	19					
	20					
	21	1.20664			25	21
	22	1.20664			25	21
	23	1.20664	39.68	0.16	248	21
	24	1.20664			26	22
	25					
	26					
	27					
	28					
	29					
	30					
OCTOBER	1					
	2					
	3					

PLATING BATH 2004 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11	1.20309			27	22
	12	1.20309			25	21
	13	1.20309	39.04	0.20	195	21
	14	1.20309			26	22
	15	1.20309			25	21
	16					
	17					
	18	1.20784			25	21
	19	1.20784			25	21
	20	1.20784	39.91	0.18	222	22
	21	1.20784			28	23
	22					
	23					
	24					
	25	1.20292			27	22
	26	1.20292			26	22
	27	1.20292	39.01	0.17	229	22
	28	1.20292			25	21
	29	1.20292			25	21
	30					
	31					
NOVEMBER	1	1.20012			25	
	2	1.20012			25	21
	3	1.20012	38.47	0.16	240	26
	4	1.20012			26	22
	5	1.20012			25	21
	6					
	7					
	8	1.20345			25	21
	9	1.20345			25	21
	10	1.20345	39.10	0.16	244	22
	11	1.20345			26	22
	12	1.20345			25	21
	13					
	14					
	15	1.19950			25	21
	16	1.19950			27	23
	17	1.19950	38.35	0.18	213	21
	18	1.19950			26	22

PLATING BATH 2004 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
DECEMBER	19	1.19950			25	21
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29	1.19893			25	21
	30	1.19893			25	21
	1	1.19893	38.24	0.18	212	21
	2	1.19893			25	21
	3	1.19893			25	21
	4					
	5					
	6	1.20101			26	22
	7	1.20101			26	22
	8	1.20101	38.64	0.18	215	21
	9	1.20101			25	21
	10	1.20101			25	21
	11	1.20101			25	21
	12					
	13	1.19935			25	21
	14	1.19935			25	21
	15	1.19935	38.32	0.18	213	21
	16	1.19935			25	21
	17	1.19935			24	20
	18	1.19935			25	21
	19	1.19935			26	22
	20	1.21019			24	20
	21	1.21019			24	20
	22	1.21019	40.37	0.18	224	21

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JANUARY	1					
	2					
	3					
	4					
	5					
	6	1.22508			30	24
	7	1.22508			26	21
	8	1.22508			25	20
	9	1.22508			26	21
	10	1.22508			31	25
	11	1.22508	43.36	0.18	241	
	12					
	13	1.23250			29	24
	14	1.23250			29	24
	15	1.23250			30	24
	16	1.23250			29	24
	17	1.23250			29	24
	18	1.23250	44.85	0.16	280	
	19					
	20	1.22392			28	23
	21	1.22392			27	22
	22	1.22392			26	21
	23	1.22392			26	21
	24	1.22392			27	22
	25	1.22392	43.13	0.16	270	
	26					
	27	1.22679			25	20
	28	1.22679			25	20
	29	1.22679			25	20
	30	1.22679			26	21
	31	1.22679			27	22
FEBURARY	1	1.22679	43.70	0.18	243	
	2					
	3	1.20836			26	22
	4	1.20836			25	21
	5	1.20836			26	22
	6	1.20836			26	22
	7	1.20836			26	22
	8	1.20836	40.60	0.20	203	
	9					
	10	1.22046			26	21
	11	1.22046			25	20
	12	1.22046			26	21
	13	1.22046			26	21
	14	1.22046			26	21

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
MARCH	15	1.22046	42.44	0.20	212	
	16					
	17					
	18	1.22101			25	20
	19	1.22101			25	20
	20	1.22101			25	20
	21	1.22101			26	21
	22	1.22101	42.55	0.18	236	
	23					
	24	1.21698			26	21
	25	1.21698			26	21
	26	1.21698			25	21
	27	1.21698			26	21
	28	1.21698			26	21
	1	1.21698	41.75	0.22	190	
	2					
	3	1.21698			26	21
	4	1.21698			25	21
	5	1.21698			27	22
	6	1.21698			26	21
	7	1.21698			26	21
	8					
	9					
	10	1.21698			26	21
	11	1.21698			25	21
	12	1.21698			27	22
	13	1.21698			26	21
	14	1.21698			26	21
	15					
	16					
	17	1.22101			25	20
	18	1.22101			26	21
	19	1.22101			26	21
	20	1.22101			26	21
	21	1.22101			26	21
	22	1.22101	42.55	0.18	236	
	23					
	24	1.21402			26	21
	25	1.21402			27	22
	26	1.21402			27	22
	27	1.21402			26	21
	28	1.21402			26	21
	29	1.21402	41.17	0.18	229	
	30					
	31	1.19790			26	22

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
APRIL	1	1.19790			26	22
	2	1.19790			26	22
	3	1.19790			27	23
	4	1.19790			27	23
	5	1.19790	38.04	0.20	190	
	6					
	7	1.20988			27	22
	8	1.20988			26	21
	9	1.20988			28	23
	10	1.20988			26	21
	11	1.20988			27	22
	12	1.20988	40.31	0.20	202	
	13					
	14	1.20856			28	23
	15	1.20856			26	22
	16	1.20856			27	22
	17	1.20856			27	22
	18	1.20856	40.05	0.18	223	
	19					
	20					
	21	1.20886			26	22
	22	1.20886			25	21
	23	1.20886			27	22
	24	1.20886			26	22
	25	1.20886			27	22
	26	1.20886	40.11	0.32	125	
	27					
	28	1.20345			26	22
	29	1.20345			26	22
	30	1.20345			26	22
MAY	1	1.20345			27	22
	2	1.20345			26	22
	3	1.20345	39.10	0.24	163	
	4					
	5	1.20447			26	22
	6	1.20447			26	22
	7	1.20447			27	22
	8	1.20447			26	22
	9	1.20447			26	22
	10					
	11					
	12					
	13	1.20447			26	22
	14	1.20447			25	21
	15	1.20447			26	22

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JUNE	16	1.20447			26	22
	17	1.20447	39.27	0.26	151	
	18					
	19	1.21177			26	21
	20	1.21177			26	21
	21	1.21177			27	22
	22	1.21177			26	21
	23	1.21177			28	23
	24	1.21177	40.68	0.22	185	
	25					
	26					
	27					
	28			ERR		ERR
	29					ERR
	30			ERR		ERR
	31					ERR
	1					
	2					
	3					ERR
	4			ERR		ERR
	5					ERR
	6			ERR		ERR
	7					ERR
	8					
	9					
	10	1.20399			27	22
	11	1.20399		ERR	27	22
	12	1.20399			27	22
	13	1.20399			25	21
	14					
	15					
	16					
	17	1.20399			28	23
	18	1.20399		ERR	26	22
	19	1.20399			27	22
	20	1.20399		ERR	27	22
	21	1.20399	39.19	0.18	218	
	22					
	23	1.20327			25	21
	24	1.20327			27	22
	25	1.20327			27	22
	26	1.20327			26	22
	27	1.20327			26	22
	28		39.07	0.18	217	
	29					

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JULY	30	1.20675			26	22
	1	1.20675			27	22
	2	1.20675			27	22
	3	1.20675			27	22
	4	1.20675	39.70	0.29	137	
	5					
	6					
	7	1.20054			27	22
	8	1.20054			26	22
	9	1.20054			26	22
	10	1.20054			26	22
	11	1.20054	38.55	0.18	214	26
	12					
	13					
	14	1.21264			26	21
	15	1.21264			27	22
	16	1.21264			26	21
	17	1.21264			26	21
	18	1.21264			27	22
	19	1.21264	40.85			
	20					
	21	1.20840			26	22
	22	1.20840			26	22
	23					
	24					
	25	1.20840			26	22
	26	1.20840	40.02	0.18	222	
	27					
	28	1.21605			26	21
	29	1.21605			26	21
	30	1.21605			26	21
	31	1.21605			26	21
AUGUST	1					
	2	1.21605	41.52	0.18	231	
	3					
	4	1.20417			26	22
	5	1.20417			26	22
	6	1.20417			26	22
	7	1.20417			26	22
	8	1.20417			26	22
	9	1.20417	39.22	0.20	196	
	10					
	11	1.20587			26	22
	12	1.20587			27	22
	13	1.20587			25	21

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
SEPTEMBER	14	1.20587				
	15	1.20587			26	22
	16	1.20587	39.53	0.18	220	
	17					
	18	1.20752			26	22
	19	1.20752			26	22
	20	1.20752			25	21
	21	1.20752			26	22
	22	1.20752			25	21
	23	1.20752	39.85	0.18	221	
	24					
	25	1.20861			27	22
	26	1.20861			26	22
	27	1.20861			25	21
	28	1.20861			26	22
	29	1.20861			27	22
	30					
	31					
	1	1.20861	40.06	0.18	223	
	2	1.19432			26	22
	3	1.19432			27	23
	4	1.19432			26	22
	5	1.19432	37.32	0.18	207	23
	6					
	7					
	8	1.20649			27	22
	9	1.20649			26	22
	10	1.20649			26	22
	11	1.20649			26	22
	12	1.20649			26	22
	13	1.20649	39.65	0.18	220	
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
OCTOBER	28					
	29					
	30					
	1	1.22232			26	21
	2	1.22232			27	22
	3	1.22232			29	24
	4	1.22232	42.81	0.20	214	
	5					
	6	1.21264			26	21
	7	1.21264			27	22
	8	1.21264			27	22
	9	1.21264			27	22
	10	1.21264			27	22
	11	1.21264	40.85	0.18	227	26
	12					
	13	1.20499			27	22
	14	1.20499			27	22
	15	1.20499			26	22
	16	1.20499			26	22
	17	1.20499			27	22
	18	1.20499	39.36	0.20	197	26
	19					
	20	1.20942			27	22
	21	1.20942			26	21
	22	1.20942			26	21
	23	1.20942			27	22
	24	1.20942			26	21
	25	1.20942	40.22	0.20	201	26
	26					
	27	1.20942			27	22
	28	1.20942			27	22
	29	1.20942			26	21
	30	1.20942			26	21
	31	1.20942			26	21
NOVEMBER	1					
	2					
	3					
	4					
	5					
	6					
	7		37.09	0.20	185	
	8					
	9					
	10	1.18068			26	22
	11	1.18068			26	22

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
DECEMBER	12	1.18068			34	29
	13	1.18068			29	25
	14	1.18068			29	25
	15	1.18068	34.62	0.18	192	29
	16					
	17					
	18	1.20044			26	22
	19	1.20044			26	22
	20	1.20044			26	22
	21	1.20044			29	24
	22	1.20044	38.53	0.19	203	26
	23					
	24	1.20809			29	24
	25	1.20809			25	21
	26	1.20809			25	21
	27					
	28	1.20809	39.96	0.26	154	
	29					
	30					
	1	1.19233			24	20
	2	1.19233			25	21
	3	1.19233			25	21
	4	1.19233			25	21
	5	1.19233			24	20
	6	1.19233	36.92	0.18	205	26
	7					
	8	1.19760			24	20
	9	1.19760			25	21
	10	1.19760				
	11	1.19760			24	20
	12	1.19760			25	21
	13	1.19760	37.98	0.19	200	25
	14					
	15	1.19288			24	20
	16	1.19288			24	20
	17	1.19288			25	21
	18	1.19288			24	20
	19	1.19288			25	21
	20	1.19288	37.08	0.22	169	24
	21	1.19288			25	21
	22	1.19288			24	20
	23	1.19288			24	20
	24					
	25					
	26					

PLATING BATH 2003 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	27					
	28					
	29					
	30					
	31					

PLATING BATH 2002 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JANUARY	1					
	2	1.21930			31	25
	3	1.21930	42.21	0.20	30	25
	4	1.21930			32	26
	5					
	6					
	7	1.21754			30	25
	8	1.21754	41.86	0.20	25	21
	9	1.21754			29	24
	10	1.21754	41.86	0.20	27	22
	11	1.21754				
	12					
	13					
	14	1.21402			29	24
	15	1.21402	41.17	0.21	27	22
	16	1.21402			30	25
	17	1.22392	43.13	0.21	31	25
	18	1.22392			27	22
	19					
	20					
	21	1.22101			29	24
	22	1.22101	42.55	0.20	28	23
	23	1.22101			26	21
	24	1.21871	42.09	0.20	29	24
	25	1.21871			29	24
	26					
	27					
	28	1.21463			26	21
	29	1.21463	41.29	0.20	26	21
	30	1.21463			29	24
	31	1.21754	41.86	0.20	28	23
FEBURARY	1	1.21754			29	24
	2					
	3					
	4	1.21636			31	25
	5	1.21636	41.63	0.20	26	21
	6	1.21636			27	22
	7	1.22217	42.78	0.22	27	22
	8	1.22217			27	22
	9					
	10					
	11	1.22161			27	22
	12	1.22161	42.67	0.22	30	25
	13	1.22161			27	22
	14	1.22508	43.36	0.22	197	22

PLATING BATH 2002 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
MARCH	15	1.22508			28	23
	16					
	17					
	18	1.22046			28	23
	19	1.22046	42.44	0.20	212	25
	20	1.22046			26	21
	21	1.21754	41.86	0.19	220	21
	22	1.21754			27	22
	23					
	24					
	25	1.21754			32	26
	26	1.21754	41.86	0.20	209	22
	27	1.21754			32	26
	28	1.21228	40.83	0.20	204	26
	29					
	1					
	2					
	3					
	4	1.21228			30	25
	5	1.21228	40.83	0.20	204	24
	6	1.21228			27	22
	7	1.21636	41.63	0.20	208	25
	8	1.21636			28	23
	9					
	10					
	11	1.21519			27	22
	12	1.21519	41.40	0.20	207	22
	13	1.21519			30	25
	14	1.21228	40.83	0.19	215	22
	15					
	16					
	17					
	18	1.20401			33	27
	19	1.20401	39.22	0.19	206	27
	20	1.20401			36	30
	21	1.20401			35	29
	22					
	23					
	24					
	25	1.21463			36	30
	26	1.21463	41.29	0.20	206	26
	27	1.21463			29	24
	28	1.21463			29	24
	29					
	30					

PLATING BATH 2002 TESTS

CHROME

		SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
APRIL	31						
	1	1.20639				33	27
	2	1.20639	39.68	0.20	198	30	25
	3	1.20639				28	23
	4	1.21402	41.17	0.20	206	28	23
	5						
	6						
	7						
	8	1.21346				34	28
	9	1.21346	41.06	0.20	205	33	27
	10	1.21346				32	26
	11	1.21815	41.98	0.20	210	31	25
	12	1.21815				33	27
	13						
MAY	14						
	15	1.21815				33	
	16	1.21815				28	23
	17	1.21815	41.98	0.20	210	31	25
	18	1.21815				31	25
	19	1.21815				35	29
	20						
	21						
	22	1.21754				34	28
	23	1.21754	41.86	0.20	209	33	27
	24	1.21754				33	27
	25	1.21754				31	25
	26	1.21754				35	29
	27						
	28						
	29	1.21346				37	30
	30	1.21346	41.06	0.20	205	35	29
	1	1.21346				33	27
	2	1.21346				33	27
	3	1.21346				35	29
	4						
	5						
	6	1.20933				30	25
	7	1.20933	40.25	0.20	201	30	25
	8	1.20933				35	29
	9	1.20933				35	29
	10	1.20933				35	29
	11						
	12						
	13						
	14						

PLATING BATH 2002 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
15						
16						
17						
18						
19						
20	1.21636				29	24
21	1.21636	41.63	0.19	219	35	29
22	1.21636				29	24
23	1.21985	42.32	0.22	192	27	22
24	1.21985				33	27
25						
26						
27						
28	1.21815	41.98	0.20	210	33	27
29	1.21815				32	26
30	1.22563	43.47	0.20	217	34	28
31	1.22563				36	29
JUNE						
1						
2						
3	1.22563				36	29
4	1.22563	43.47	0.16	272	34	28
5	1.22563				33	27
6	1.21815	41.98	0.20	210	36	30
7	1.21815				32	26
8						
9						
10	1.22101				35	29
11	1.22101	42.55	0.20	213	36	29
12	1.22101				34	28
13	1.22101				35	29
14						
15						
16						
17	1.21463				36	30
18	1.21463	41.29	0.18	229	34	28
19	1.21463				37	30
20	1.21228	40.83	0.22	186	36	30
21	1.21228				31	26
22						
23						
24	1.21815				39	32
25	1.21815	41.98	0.22	191	37	30
26	1.21815				36	30
27						
28						

PLATING BATH 2002 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JULY	29					
	30					
	1				39	
	2				38	
	3				34	
	4					
	5					
	6					
	7					
	8	1.21346			38	31
	9	1.21346	41.06	0.22	38	31
	10	1.21346			36	30
	11	1.21346			39	32
	12	1.21346			39	32
	13					
	14					
	15	1.21930			41	34
	16	1.21930	42.21	0.20	41	34
	17	1.21930			39	32
	18	1.21930			39	32
	19	1.21930			39	32
	20	1.21930			37	30
	21					
	22	1.22508			36	29
	23	1.22508			39	32
	24	1.22508	43.36	0.32	34	28
	25	1.22508			37	30
	26	1.22508			38	31
	27	1.22508			37	30
	28					
	29	1.22508			36	29
	30	1.22508			36	29
	31	1.22508			33	27
AUGUST	1	1.22508			35	29
	2	1.22508			36	29
	3					
	4					
	5	1.22508			35	29
	6	1.22332	43.01	0.24	35	29
	7	1.22332			32	26
	8	1.22332			33	27
	9					
	10					
	11					
	12	1.22563			33	27

PLATING BATH 2002 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	13	1.22563	43.47	0.24	181	35 29
	14	1.22563			34	28
	15	1.22563			35	29
	16	1.22563			34	28
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26	1.22563			33	27
	27	1.22563			34	28
	28	1.22563			33	27
	29	1.22563			35	29
	30	1.22563			32	26
	31					
SEPTEMBER	1					
	2					
	3	1.22563			32	26
	4	1.22563			32	26
	5	1.22563			33	27
	6	1.22563			31	25
	7					
	8					
	9	1.22563			34	28
	10	1.22563			31	25
	11	1.22563	43.47	0.20	217	28 23
	12	1.22563			31	25
	13	1.22563			32	26
	14					
	15					
	16	1.22563			32	26
	17	1.22563			26	21
	18	1.22563			30	24
	19	1.22563			31	25
	20	1.22563			27	22
	21					
	22					
	23					
	24	1.22563			31	25
	25	1.22563			34	28
	26	1.22563			27	22

PLATING BATH 2002 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
OCTOBER	27	1.22563			26	21
	28					
	29					
	30	1.22563			32	26
	1	1.22563				
	2	1.22563			31	25
	3	1.22563			27	22
	4	1.22563			31	25
	5	1.22900	44.62	0.22	203	
	6					
	7	1.22900			32	26
	8	1.22900			27	22
	9	1.22900			30	24
	10	1.22900			30	24
	11					
	12					
	13					
	14					
	15					
	16					
	17	1.22392			32	26
	18	1.22392			31	25
	19	1.22392	43.13	0.22	196	24
	20					
	21	1.22392			28	23
	22	1.22392			27	22
	23	1.22392			31	25
	24	1.22392			31	25
	25	1.22392			27	22
	26	1.22101	42.55	0.22	193	21
	27					
	28	1.22101			26	21
	29	1.22101			27	22
	30	1.22101			27	22
	31	1.22101			26	21
NOVEMBER	1	1.22101			27	22
	2	1.21463	41.29	0.22	188	27
	3					
	4	1.21463			30	25
	5	1.21463			26	21
	6	1.21463			31	26
	7	1.21463			30	25
	8	1.21463			25	21
	9	1.21871	42.09	0.20	210	
	10					

PLATING BATH 2002 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	11	1.21871			26	21
	12	1.21871			27	22
	13	1.21871				
	14	1.21871			25	21
	15	1.21871			26	21
	16	1.21402	41.17	0.20	206	
	17					
	18	1.21402				
	19	1.21402			29	24
	20	1.21402			31	26
	21	1.21402			31	26
	22	1.21402			26	21
	23		41.29	0.20	206	
	24					
	25	1.21463			32	26
	26	1.21463			27	22
	27	1.21463			25	21
	28					
	29					
	30					
DECEMBER	1					
	2					
	3					
	4	1.21519	41.40	0.22	188	
	5	1.21519			31	26
	6	1.21519			26	21
	7					
	8					
	9	1.21519			26	21
	10	1.21519			30	25
	11	1.21519			33	27
	12	1.21519			30	25
	13	1.21519			31	26
	14	1.21815	41.98	0.16	262	
	15					
	16	1.21815			25	21
	17	1.21815			29	24
	18	1.21815			28	23
	19					
	20	1.21815			26	21

PLATING BATH 2001 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JANUARY	1					
	2	1.19805	38.07	0.20	190	29
	3	1.19805			29	24
	4	1.20163	38.76	0.20	194	29
	5	1.20163			25	21
	6					
	7					
	8	1.19462			28	23
	9	1.19462	37.38	0.20	187	25
	10	1.19462			25	21
	11	1.20458	39.33	0.20	197	27
	12	1.20458			26	22
	13					
	14					
	15	1.20282			29	24
	16	1.20282	38.99	0.20	195	26
	17	1.20282			26	22
	18	1.21111	40.60	0.18	226	28
	19	1.21111			26	21
	20					
	21					
	22	1.21228			28	23
	23	1.21228	40.83	0.18	227	28
	24	1.21228			27	22
	25	1.21930	42.21	0.18	234	25
	26	1.21930			29	24
	27					
	28					
	29	1.21580			29	24
	30	1.21580	41.52	0.20	208	28
	31	1.21580			28	23
FEBURARY	1	1.21519	41.40	0.20	207	30
	2	1.21519			29	24
	3					
	4					
	5	1.21636			29	24
	6	1.21636	41.63	0.22	189	29
	7	1.21636			30	25
	8	1.20696	39.79	0.20	199	29
	9	1.20696				0
	10					
	11					
	12					
	13	1.20458	39.33	0.19	207	30
	14	1.20458			28	23

PLATING BATH 2001 TESTS

CHROME

		SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
MARCH	15	1.21167	40.71	0.19	214	28	23
	16	1.21167				28	23
	17						
	18						
	19	1.20028				27	22
	20	1.20028	38.50	0.20	192	29	24
	21	1.20696				29	24
	22	1.20696	39.79	0.20	199	28	23
	23	1.20696				27	22
	24						
	25						
	26	1.19935				25	21
	27	1.19935	38.32	0.20	192	25	21
	28	1.19935				25	21
	29						
	1	1.20442	39.30	0.20	197	26	22
	2	1.20442				27	22
	3						
	4						
	5	1.20370				25	21
	6	1.20370	39.16	0.18	218	26	22
	7	1.20370				27	22
	8	1.20520	39.45	0.18	219	25	21
	9	1.20520				25	21
	10						
	11						
	12	1.19981				28	23
	13	1.19981	38.41	0.18	213	25	21
	14	1.19981				26	22
	15	1.20861	40.11	0.18	223	25	21
	16	1.20861				25	21
	17						
	18						
	19	1.20759				25	21
	20	1.20759	39.91	0.20	200	26	22
	21	1.20759				28	23
	22	1.20624	39.65	0.20	198	25	21
	23	1.20624				29	24
	24						
	25						
	26						
	27	1.20727	39.85	0.20	199	29	24
	28	1.20727				28	23
	29	1.20489	39.39	0.20	197	25	21
	30	1.20489				25	21

PLATING BATH 2001 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
APRIL	31					
	1					
	2	1.19924			25	21
	3	1.19924	38.30	0.20	191	26
	4	1.19924			28	23
	5	1.19303	37.06	0.20	185	27
	6	1.19303				0
	7					
	8					
	9	1.20085			29	24
	10	1.20085	38.61	0.20	193	27
	11	1.20085			26	22
	12	1.20085			27	22
	13					
	14					
	15					
	16	1.18859			28	24
	17	1.18859	36.17	0.20	181	28
	18	1.18859			26	22
	19	1.21519	41.40	0.20	207	30
	20	1.21519			31	26
	21					
	22					
	23	1.21519			30	25
	24	1.21519	41.40	0.19	218	27
	25	1.21519	13.10		26	21
	26	1.21519	41.40	0.20	207	26
	27	1.21519			29	24
	28					
	29					
MAY	30	1.21167			29	24
	1	1.21167	40.71	0.20	204	28
	2	1.21167			28	23
	3	1.21111	40.60	0.19	214	28
	4	1.21111			29	24
	5					
	6					
	7	1.20994			29	24
	8	1.20994	40.37	0.20	202	28
	9	1.20994			29	24
	10	1.21050	40.48	0.20	202	29
	11	1.21050			29	24
	12					
	13					
	14	1.20815			31	26

PLATING BATH 2001 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	15	1.20815	40.02	0.20	200	29
JUNE	16	1.20815				24
	17	1.20933	40.25	0.20	201	30
	18	1.20933				25
	19					21
	20					26
	21	1.20759				31
	22	1.20759	39.91	0.19	210	26
	23	1.20759				25
	24	1.21228	40.83	0.20	204	29
	25					24
	26					21
	27					
	28					
	29					
	30					
	31					
	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12	1.20339	39.10	0.18	217	32
	13	1.20339				27
	14	1.21985	42.32	0.18	235	30
	15	1.21985				25
	16					28
	17					32
	18	1.21285				26
	19	1.21285	40.94	0.18	227	30
	20	1.21285				25
	21	1.21228	40.83	0.18	227	30
	22	1.21228				25
	23					26
	24					31
	25	1.20877				26
	26	1.20877	40.14	0.18	223	31
	27	1.20877				26
	28	1.21580	41.52	0.22	189	32

PLATING BATH 2001 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JULY	29	1.21580			32	26
	30					
	1					
	2	1.21228			31	26
	3	1.21228	40.83	0.20	204	31
	4					
	5	1.21228			30	25
	6	1.21228			33	27
	7					
	8					
	9	1.21871			32	26
	10	1.21871	42.09	0.20	210	30
	11	1.21871			31	25
	12	1.21402	41.17	0.20	206	29
	13	1.21402			28	23
	14					
	15					
	16					
AUGUST	17	1.21698	41.75	0.20	209	36
	18	1.21698			33	27
	19	1.20994	40.37	0.18	224	35
	20	1.20994			34	28
	21					
	22					
	23	1.20458			35	29
	24	1.20458	39.33	0.19	207	35
	25	1.20458			38	32
	26	1.20877	40.14	0.20	201	36
	27	1.20877			35	29
	28					
	29					
	30					
	31					ERR
	1					ERR
	2					ERR
	3					ERR
	4					ERR
	5					
	6	1.21167			34	28
	7	1.21167	40.71	0.20	204	32
	8	1.21167			31	26
	9	1.21050	40.48	0.20	202	31
	10	1.21050			35	29
	11					
	12					

PLATING BATH 2001 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
SEPTEMBER	13	1.20520			32	27
	14	1.20520	39.45	0.18	219	34
	15	1.20520			32	27
	16	1.21228	40.83	0.18	227	33
	17	1.21228			32	26
	18					
	19					
	20	1.21346			33	27
	21	1.21346	41.06	0.20	205	29
	22	1.21346			32	26
	23	1.21402	41.17	0.18	229	34
	24					
	25					
	26					
	27					
	28	1.21111	40.60	0.18	226	33
	29	1.21111			33	27
	30	1.21167	40.71		33	27
	31	1.21167			32	26
	1					
	2					
	3					
	4	1.21167	40.71	0.18	226	36
	5	1.21167			34	28
	6	1.21463	41.29	0.18	229	33
	7	1.21463				0
	8					ERR
	9					
	10	1.20994			31	
	11	1.20994	40.37	0.18	224	32
	12	1.20994			32	26
	13	1.21346	41.06	0.18	228	32
	14					
	15					
	16					
	17	1.21580			33	27
	18	1.21580	41.52	0.18	231	33
	19	1.21580			31	25
	20	1.21346	41.06	0.18	228	33
	21	1.21346			32	26
	22					
	23					
	24	1.21402			37	30
	25	1.21402	41.17	0.20	206	34
	26	1.21402			31	26

PLATING BATH 2001 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
OCTOBER	27	1.21519	41.40	0.20	207	32
	28	1.21519				30
	29					25
	30					
	1					
	2	1.21346	41.06	0.18	228	35
	3	1.21346				27
	4	1.21346	41.06	0.20	205	32
	5	1.21346				27
	6					
	7					
	8	1.21111				26
	9	1.21111	40.60	0.22	185	33
	10	1.21111				25
	11	1.21167	40.71	0.22	185	33
	12	1.21167				27
	13					
	14					
	15	1.20639				27
	16	1.20639	39.68	0.22	180	32
	17	1.20639				25
	18	1.21228	40.83	0.22	186	33
	19	1.21228				27
	20					
	21					
	22	1.20815				27
	23	1.20815	40.02	0.21	191	30
	24	1.20815				25
	25	1.21815	41.98	0.22	191	32
	26					26
NOVEMBER	27					
	28					
	29					
	30					
	31					
	1					
	2					
	3					
	4					
	5	1.19745				28
	6	1.19745	37.95	0.20	190	30
	7	1.19745				25
	8	1.19745	37.95	0.20	190	31
	9					26
	10					

PLATING BATH 2001 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
	11					
	12	1.19691			32	27
	13	1.19691	37.84	0.20	189	30
	14	1.19691			29	24
	15	1.20220	38.87	0.20	194	26
	16	1.20220			30	25
	17					
	18					
	19	1.20220			32	27
	20					
	21					
	22					
	23					
	24					
	25					
	26	1.19348			32	27
	27	1.19348	37.15	0.18	206	29
	28	1.19348			31	26
	29	1.20282	38.99	0.18	217	31
	30	1.20282			29	24
DECEMBER	1					
	2					
	3	1.20815			32	26
	4	1.20815	40.02	0.20	200	31
	5	1.20815			31	26
	6	1.21346	41.06	0.20	205	31
	7	1.21346			33	27
	8					
	9					
	10	1.21111			29	24
	11	1.21111	40.60	0.19	214	28
	12	1.21111			29	24
	13	1.21285	40.94	0.20	205	31
	14					
	15					
	16					
	17	1.20994			30	25
	18	1.20994	40.37	0.20	202	32
	19	1.20994			32	26
	20					
	21					
	22					
	23					
	24					
	25					

PLATING BATH 2000 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JANUARY	1					
	2					
	3					
	4	1.19144	36.74	0.18	204	29
	5	1.19144				24
	6	1.18155	34.79	0.17	205	27
	7	1.18155				23
	8					26
	9					22
	10	1.17550	33.58	0.16	210	26
	11	1.17550				21
	12	1.17550				24
	13					20
	14					26
	15					22
	16					
	17					
	18					
	19	1.18640	35.74	0.18	199	29
	20	1.18640				24
	21					28
	22					24
	23					20
	24	1.18344				27
	25	1.18344	35.16	0.17	207	25
	26	1.18344				21
	27	1.18390	36.25	0.20	181	27
	28					23
	29					
	30					
FEBURARY	31	1.18303				30
	1	1.18303	35.08	0.16	219	27
	2	1.18303				23
	3	1.18696	35.85	0.17	211	28
	4					24
	5					
	6					
	7	1.18696				27
	8	1.18890	36.23	0.16	226	28
	9	1.18890				24
	10	1.18170	34.82	0.16	218	27
	11	1.18170				23
	12					28
	13					24
	14	1.18170				25

PLATING BATH 2000 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
MARCH	15	1.18655	35.77	0.18	199	29 24
	16	1.18655			28	24
	17	1.18640	35.74	0.18	199	31 26
	18	1.18640			29	24
	19					
	20					
	21	1.18844			30	25
	22	1.18844	36.14	0.18	201	29 24
	23	1.18844			30	25
	24	1.18803	36.05	0.18	200	25 21
	25	1.18803			29	24
	26					
	27					
	28	1.18538			31	26
	29	1.18538	35.54	0.17	209	29 24
	1	1.18538			28	24
	2	1.19676	37.81	0.18	210	28 23
	3	1.19676			29	24
	4					
	5					
	6	1.21125	41.57	0.17	245	28 23
	7	1.21125			29	24
	8	1.21125			30	25
	9	1.19173	36.80	0.17	216	27 23
	10	1.19173			29	24
	11					
	12					
	13	1.22679			31	25
	14	1.22679	43.70	0.20	219	29 24
	15	1.22679			29	24
	16	1.21183	40.74	0.20	204	29 24
	17	1.21183			29	24
	18					
	19					
	20	1.21183			28	23
	21	1.20562	39.53	0.20	198	29 24
	22	1.20562			28	23
	23					
	24	1.20562			28	23
	25					
	26					
	27	1.20639			26	22
	28	1.20639	39.68	0.20	198	28 23
	29	1.20639			29	24
	30	1.20948	40.28	0.20	201	29 24

PLATING BATH 2000 TESTS

CHROME

		SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
APRIL	31	1.20948				27	22
	1						
	2						
	3	1.20917				29	24
	4	1.20917	40.22	0.18	223	25	21
	5	1.20917				27	22
	6	1.20696	39.79	0.18	221	27	22
	7	1.20696				25	21
	8						
	9						
	10	1.20712				28	23
	11	1.20712	39.82	0.18	221	26	22
	12	1.20712				25	21
	13	1.20800	39.99	0.20	200	27	22
	14	1.20800				27	22
	15						
	16						
	17	1.19981				25	21
	18	1.19981	38.41	0.20	192	25	21
	19	1.19981				27	23
	20	1.19862	38.18	0.20	191	28	23
	21						
	22						
	23						
	24						
	25	1.19790	38.04	0.20	190	29	24
	26	1.19790				28	23
	27	1.20458	39.33	0.20	197	27	22
	28	1.20458				29	24
	29						
MAY	30						
	1	1.20458				27	22
	2	1.20877	40.14	0.20	201	26	22
	3	1.20877				28	23
	4	1.20593	39.59	0.18	220	28	23
	5	1.20593				29	24
	6						
	7						
	8	1.19924				61	51
	9	1.19924	38.30	0.19	202	28	23
	10	1.19924				30	25
	11	1.21137	40.65	0.16	254	31	26
	12	1.21137				30	25
	13						
	14						

PLATING BATH 2000 TESTS

CHROME

		SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JUNE	15	1.20800				31	26
	16	1.20800	39.99	0.16	250	29	24
	17	1.20800				29	24
	18	1.20759	39.91	0.16	249	25	21
	19	1.20759				30	25
	20						
	21	1.20665				33	27
	22	1.20665	39.73	0.16	248	30	25
	23	1.20665				30	25
	24						
	25						
	26						
	27						
	28						
	29						
	30	1.20769	39.93	0.17	235	31	26
	31	1.20769				31	26
	1	1.20354	39.13	0.16	245	30	25
	2	1.20354				29	24
	3						
	4						
	5	1.20028				29	24
	6	1.20028	38.50	0.16	241	30	25
	7	1.20028				28	23
	8	1.21300	40.97	0.17	241	28	23
	9	1.21300				27	22
	10						
	11						
	12	1.20411				28	23
	13	1.20411	39.24	0.17	231	29	24
	14	1.20411				28	23
	15	1.21167	40.71	0.18	226	31	26
	16	1.21167				31	26
	17						
	18						
	19	1.21167				31	26
	20	1.21167	40.71	0.20	204	29	24
	21						
	22	1.21167				30	25
	23	1.21167				30	25
	24						
	25						
	26	1.20759				31	26
	27	1.20759	39.91	0.18	222	30	25
	28	1.20759				30	25

PLATING BATH 2000 TESTS

CHROME

		SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
JULY	29	1.20759				29	24
	30	1.20759				33	27
	1						
	2						
	3						
	4						
	5	1.20759				37	31
	6	1.21167	40.71	0.18	226	31	26
	7	1.21167				31	26
	8						
	9						
	10	1.21167				32	26
	11	1.20639	39.68	0.18	220	31	26
	12						
	13						
	14						
	15						
	16						
	17						
	18						
AUGUST	19	1.20933				33	27
	20	1.20933	40.25	0.19	212	30	25
	21	1.20933				30	25
	22						
	23						
	24	1.20759				31	26
	25	1.20759	39.91	0.18	222	29	24
	26	1.20759				31	26
	27	1.20759	39.91	0.20	200	30	25
	28	1.20759				28	23
	29						
	30						
	31	1.20759				33	27
	1	1.20759	39.91	0.19	210	31	26
	2	1.20759				29	24
	3	1.21519	41.40	0.18	230	29	24
	4	1.21519				31	26
	5						
	6						
	7	1.21402				32	26
	8	1.21402	41.17	0.18	229	31	26
	9	1.21402				30	25
	10	1.21402	41.17	0.17	242	30	25
	11	1.21402				29	24
	12						

PLATING BATH 2000 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
SEPTEMBER	13					
	14	1.21228			28	23
	15	1.21228	40.83	0.18	227	30
	16	1.21228			29	24
	17	1.21228			29	24
	18	1.21228			27	22
	19					
	20					
	21	1.21228			30	25
	22	1.21463	41.29	0.20	206	30
	23	1.21463			29	24
	24	1.21815	41.98	0.20	210	29
	25	1.21815			29	24
	26					
	27					
	28	1.20815			30	25
	29	1.20815	40.02	0.20	200	30
	30	1.20815			28	23
	31	1.21346	41.06	0.20	205	29
	1	1.21346			28	23
	2					
	3					
	4					
	5	1.21228	40.83	0.20	204	30
	6	1.21228			29	24
	7	1.21519	41.40	0.20	207	26
	8	1.21519			30	25
	9					
	10					
	11	1.21111			30	25
	12	1.21111	40.60	0.20	203	30
	13	1.21111			30	25
	14	1.21111			29	24
	15	1.21111			25	21
	16					
	17					
	18					
	19	1.19924	39.68	0.20	198	30
	20	1.19924			30	25
	21	1.20520	39.45		29	24
	22	1.20520			28	23
	23					
	24					
	25	1.20520			28	23
	26	1.21930	42.21		27	22

PLATING BATH 2000 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
OCTOBER	27	1.21930			28	23
	28	1.21636	41.63		25	21
	29					
	30					
	1					
	2	1.21636			29	24
	3	1.21111	40.60		30	25
	4	1.21111			29	24
	5	1.21111	40.60	0.20	203	29
	6					
	7					
	8					
	9	1.21111			30	25
	10	1.22840	44.05	0.20	220	28
	11	1.21111			28	23
	12	1.21111	40.60	0.20	203	28
	13	1.21111			29	24
	14					
	15					
	16	1.21111			29	24
	17	1.21111			34	28
	18	1.21402	41.17	0.20	206	30
	19	1.21402			30	25
	20	1.21402			30	25
	21					
	22					
	23	1.20815			30	25
	24	1.20815	40.02	0.20	200	29
	25	1.20815			30	25
	26	1.21463	41.29	0.20	206	29
	27	1.21463			31	26
	28					
	29					
	30					
	31					
NOVEMBER	1					
	2					
	3					
	4					
	5					
	6	1.19402			30	25
	7	1.19402	37.26	0.18	207	27
	8	1.19402			26	22
	9	1.19805	38.07	0.18	211	29
	10	1.19805			29	24

PLATING BATH 2000 TESTS

CHROME

	SG	CHROME	SO4	RATIO	SP READING	SURFACE TENSION
11						
12						
13	1.19631				32	27
14	1.19631	37.72	0.18	210	29	24
15	1.19631				28	23
16	1.20458	39.33	0.18	219	28	23
17						
18						
19						
20	1.20044				29	24
21	1.20044	38.53	0.18	214	28	23
22	1.20044				29	24
23						
24						
25						
26						
27	1.20101				29	24
28	1.20101	38.64	0.18	215	25	21
29	1.20282				27	22
30	1.20282	38.99	0.18	217	28	23
DECEMBER	1	1.20282			28	23
	2					
	3					
	4					
	5	1.19981	38.41	0.18	213	23
	6	1.19981			26	22
	7	1.20759	39.91	0.18	222	22
	8	1.20759			26	22
	9					
	10					
	11					
	12	1.20220	38.87	0.18	216	25
	13	1.20220			25	21
	14	1.20044	38.53	0.18	214	29
	15	1.20044			27	22
	16					
	17					
	18	1.19805			27	23
	19	1.19805	38.07	0.18	211	28
	20	1.19805			28	23
	21	1.20044	38.53	0.17	227	28
	22					
	23					
	24					
	25					

ATTACHMENT D



ALL-STAR CHEMICAL CO.
275-E OLD COUNTY LINE RD.
WESTERVILLE, OHIO 43081
TELEPHONE: (614) 882-0073
FAX: (614) 882-3660

C. M. S. '96

C. M. S. '96 is a concentrated liquid used in chromic acid baths in order to create and maintain a foam blanket that prevents chromic acid mist and noxious fumes from entering the atmosphere. It is the perfect solution for decorative chromium platers using chromic acid baths to comply with the new Federal EPA regulations for chromium emissions. With no adverse effects on the plating bath, C. M. S. '96 lowers the surface tension of the chrome bath, reducing the drag out of the solution. This reduces chrome loss and contamination of the following rinses, which reduces waste disposal problems by keeping the solution in the plating tank.

IMPORTANT FEATURES:

- Keeps user in compliance with new EPA air regulations.
- Easy and economical to use.
- Lowers surface tension, which significantly reduces chrome drag out.
- Promotes safer working conditions.
- Reduces waste treatment costs.
- Safe in all decorative chrome baths.
- Reduces heating costs.

OPERATIONAL INFORMATION:

Solution Make-Up: An initial addition of .25% by volume of C. M. S. '96 will reduce surface tension of a typical chrome bath below 45 dynes/cm.

Tests conducted in the All-Star Chemical laboratory have proven C. M. S. '96 to be a safe and easy way to comply with the new EPA air regulations for chromium emissions.

CONTROL AND MAINTENANCE:

C. M. S. '96 is effective over an extremely wide range of concentrations in an operating solution. Therefore, no analytical control is necessary. The need for maintenance additions can be determined by observing the foam blanket on the chrome tank. Height and consistency of the foam blanket vary with surface area of the tank and current concentration. C. M. S. '96 can be added as needed to maintain optimum results.

HANDLING AND STORAGE:

Keep from freezing. If this product is exposed to temperatures below 50°F, a partial freezing of some components may occur. If this happens, allow the container to stand for at least eight hours in a room at or above 65F and shake container to bring components back into solution.

This material is non-toxic, hence it does not require waste treatment. However, the solutions in which it is used do require treatment. Standard neutralization/precipitation methods are satisfactory, as are proprietary treatment methods. If local regulations are such that additional treatment to remove dissolved soils is required, interested parties should contact any of the various manufacturers of proprietary equipment.

C. M. S. '96 is a near neutral liquid that is safe to handle. Nevertheless, the preparation, maintenance, and disposal of solutions containing C. M. S. '96 require the handling of chromic acid. Avoid contact with skin and eyes. Wear proper clothing and safety gear. In the event of any contact, flush immediately with a large volume of water and contact a physician.

NON-WARRANTY:

All statements, technical information and recommendations are based on tests we believe to be reliable and accurate but are not guaranteed. Since we have no control over the conditions of the use of this product, we cannot warrant that the same results will be achieved by the customer. Products are warranted to be free from defects in material and workmanship at the time sold. The sole obligation of the seller and manufacturer under this warranty shall be to replace any product defective at the time sold. Under no circumstances shall manufacturer or seller be liable for any loss, damage or expense, direct or consequential, arising out of the use of or inability to use, the product. No responsibility can be assumed for the use of this product by the customer in any process which may infringe the patents of third parties.

MATERIAL SAFETY DATA SHEET



PRODUCT IDENTIFICATION

PRODUCT NAME: C.M.S. '96

COMPONENTS

INGREDIENT	TLV	CAS NUMBER	PERCENT
AMINE PERFLUOROALKYL SULFONATE	0.1 mg/m	70225-14-8	<2.5

PHYSICAL DATA

APPEARANCE:	WATER WHITE LIQUID
EVAPORATION:	AS WATER
PERCENT VOLATILE:	<90
ODOR:	NONE
SPECIFIC GRAVITY:	1.01
SOLUBILITY IN WATER:	COMPLETE
BOILING POINT:	212°F

FIRE AND EXPLOSION HAZARD DATA

- FLASH POINT: N/A
- EXTINQUISHING MEDIA: WATER FOG, CARBON DIOXIDE FOAM, DRY CHEMICAL, HALON.
- SPECIAL FIRE FIGHTING PROCEDURES: PRESSURE DEMAND. SELF CONTAINED RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING MUST BE WORN BY FIREFIGHTERS
- UNUSUAL FIRE AND EXPLOSION HAZARDS: COMBUSTIBLE MATERIAL, LIQUID FORM IN CONTACT WITH STRONG OXIDIZERS MAY GENERATE SUFFICIENT HEAT TO IGNITE COMBUSTIBLE OR FLAMMABLE MATERIALS.

REACTIVITY DATA

- CONDITIONS TO AVOID: SPLASHING OF PRODUCT ON STRONG OXIDIZERS.
- HAZARDOUS DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE OR HYDROGEN FLUORIDE, AMMONIA, TOXIC VAPORS, GASES OR PARTICULATE COULD EVOLVE.
- INCOMPATIBILITY (MATERIALS TO AVOID): NONE KNOWN
- HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

STABLE: UNSTABLE: _____

ENVIRONMENTAL INFORMATION

- SPILL RESPONSE: WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. CAREFULLY NEUTRALIZE SPILL WITH DILUTE HCL. FLUSH AREA WITH FLOODING AMOUNTS OF WATER. USE CAUTION.
- RECOMMENDED DISPOSAL: DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.

HEALTH HAZARD DATA

CARCINOGENICITY: NONE IDENTIFIED
REPRODUCTIVE EFFECTS: NONE IDENTIFIED

EFFECTS OF OVEREXPOSURE

INHALATION: IRRITATION OF MUCOUS MEMBRANES
SKIN CONTACT: SEVERE IRRITATION OR BURNS
EYE CONTACT: SEVERE IRRITATION OR BURNS
SKIN ABSORPTION: NONE IDENTIFIED
INGESTION: GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING
CHRONIC EFFECTS: NONE IDENTIFIED
TARGET ORGANS: EYES, SKIN, RESPIRATORY SYSTEM, LUNGS

SUGGESTED FIRST AID

- EYES: IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH FLOWING WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
- SKIN: FLUSH EXPOSED AREA WITH WATER WHILE REMOVING CONTAMINATED CLOTHING. WASH AREAS THOROUGHLY WITH SOAP AND WATER.
- INHALATION: MOVE EXPOSED INDIVIDUAL TO FRESH AIR. GIVE OXYGEN OR ARTIFICIAL RESPIRATION IF NEEDED.
- INGESTION: GIVE LARGE AMOUNTS OF WATER. DO NOT INDUCE VOMITING. CALL PHYSICIAN.

SPECIAL PROTECTION INFORMATION

WEAR SAFETY GOGGLES, LAB COAT, AND PROPER GLOVES. BE SURE THERE IS ADEQUATE VENTILATION. USE CAUTION.

SPECIAL PRECAUTIONS

STORAGE AND HANDLING: KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA. PLEASE HANDLE WITH CARE.

ADDITIONAL INFORMATION

HMIG RATINGS

HEALTH: 1 FLAMM: 0 REACT: 0

COMPONENTS OF THIS PRODUCT WHICH APPEAR IN THE INGREDIENTS SECTION OF THIS MSDS ARE IDENTIFIED BELOW IF THEY ARE PRESENT IN EXCESS OF DE MINIMUS REPORTING LEVELS. COMPONENTS NOT REQUIRED TO BE IDENTIFIED BY SPECIFIC CHEMICAL NAME MAY HAVE A GENERIC DESCRIPTION.

SARA TITLE III SECTION 311/312: THIS PRODUCT POSES AN IMMEDIATE (ACUTE) HEALTH HAZARD. IT MAY BE CLASSIFIED AS CORROSIVE AS DEFINED IN 29CFR 1910.1200. THIS PRODUCT POSES A DELAYED (CHRONIC) HEALTH HAZARD. IT IS DETERMINED TO BE A CARCINOGEN ON AT LEAST ONE OF THE FOLLOWING LISTS: IARC, NTP, OR OSHA.

SARA TITLE III SECTION 313 TOXIC CHEMICALS: SODIUM HYDROXIDE.

CERCLA INFORMATION (40CFR 302.4): CONTAINS SODIUM HYDROXIDE (RQ = 1000 LB).

DOT/NMPC: NOT REGULATED

DOI: 081396